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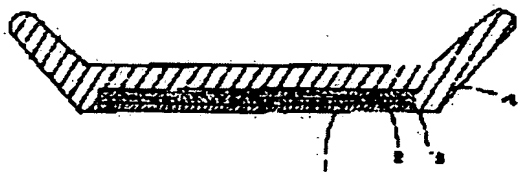
(54) METHOD FOR COMPOSING STEEL MEMBER AND ALUMINUM CASTING

(57)Abstract:

PURPOSE: To easily manufacture a composite member by forming a layer of low melting alloy, etc., depositing with an aluminum alloy on the surface of a steel member, covering the part of the steel member in contact with molten metal with a heat insulating material, impressing high pressure after pouring the molten metal and simultaneously composing the heat insulating material and the steel member.



CONSTITUTION: The galvanized steel plate 1 is directly put on a lower die of a die for high pressure casting for tableware with the galvanized surface turned up. Then mat-shaped alumina fibers are covered over the steel plate as the heat insulating material. The molten aluminum alloy is poured into the die to cover the heat insulating material. Thereafter, the high pressure is immediately impressed to this molten metal to solidify the molten metal, then a casting is taken out by opening the die. In this process, the aluminum alloy exposing one side surface of the thin steel plate 1 and having the alloy layer 2 of the low melting alloy and the aluminum and the layer 3 composed with the heat insulating material and the aluminum alloy can be cast. By this method, the aluminum-made tableware for electromagnetic cooking and the kitchen utensil can easily be manufactured.

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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] the molten metal when compound-izing a steel member with a high pressure casting process to an aluminium cast, after attaching layers, such as aluminum or an aluminium alloy (it abbreviates to an aluminum containing alloy below), and low melting alloys to weld, to the front face of a steel member, covering the part with which a steel member touches a molten metal on it with a heat insulator and injecting a molten metal into it -- high pressure -- in addition, the approach of compound-izing the iron copper section material characterized by compound-izing said heat insulator and a steel member to coincidence.
[Claim 2] The aluminium cast characterized by the thermal break which layers, such as low melting alloys prepared in the front face of a steel member, make an aluminum containing alloy and an alloy layer in the aluminium cast with which the steel member was compound-ized, and consists of minerals or a metal near said alloy layer, and an aluminum containing alloy forming the layer of composite.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention is used for it when compound-izing the metal member which is easy to produce heat distortion like a sheet metal griddle in the casting of aluminum, and it is used for manufacture of the tableware made from aluminum heated especially with an induction heating cooker etc.
[0002]
[Description of the Prior Art] the molten metal into which steel members, such as iron, are conventionally poured by the aluminium cast a ******** case -- the front face of a ****** rare ****** member -- direct -- touching -- flowing -- ****** rare ** -- it is a gating system plan [like]. In this case, the molten metal poured into mold fills mold from some mold one by one to the whole. Therefore, the steel member placed into mold will receive heat by the molten metal one by one from the part. for this reason, a steel member -- distortion -- being hard -- when it is the shape of a cylinder, and a thick thick member, a steel member is also distorted with heat -- few -- nice -- ******** -- things were made. however -- at the same time an aluminum containing alloy molten metal touches the form where thickness is 1mm or less, and one side has exposed [the diameter] the griddle 50mm or more on the surface of a casting, a ******** case at the end of a griddle -- a heat sake -- distortion, Taira and others -- ******** -- things were not made.
[0003]
[Problem(s) to be Solved by the Invention] This invention made it the technical problem to show the casting plan for sticking a thin metal plate to Taira and others with ******** and a griddle, without being in the condition which one field touched mold and another field fixed in the aluminum casting, and being distorted.
[0004]
[Means for Solving the Problem] When a steel member was filled with a molten metal, as the clearance was temporarily made between the molten metal and the steel member and heat did not get across to a ferrous material rapidly in this clearance, distortion by heat was prevented, then high pressure was applied to the molten metal, and we filled the molten metal at a stretch in said clearance, and decided to compound-ize a steel member.
[0005] That is, after attaching layers, such as an aluminum containing alloy and low melting alloys to weld, to the front face of a steel member, covering the part with which a steel member touches this molten metal with a heat insulator and pouring out this molten metal, high pressure was applied to this molten metal, and the technical problem was solved by compound-izing said heat insulator and a steel member to coincidence.
[0006]
[work --] for as mentioned above, sheet metal plate-like by the conventional approach, for example, thickness, -- 1mm or less -- a diameter -- a griddle 50mm or more -- an aluminum containing alloy molten metal -- the time of ******** -- griddle GA distortion and an even condition -- ******** -- things were not made. It is thought that one of the cause of this tending to deform the thin configuration of being monotonous, and another are to distort a griddle with heat momentarily in order to touch only one side one by one moreover from the end of a griddle, although an aluminum containing alloy molten metal is a short time.

[0007] Then, this invention was solidified, the aluminum containing alloy molten metal having touched coincidence all over one side, and this molten metal forcing a griddle on a griddle in a metal mold side. Therefore, without distorting a griddle, it is in the condition stuck to the aluminum containing alloy molten metal, and was able to compound-ize in the condition of having exposed one side of a griddle.
[0008] First, the griddle set to metal mold is covered with a heat insulator. If this mold is filled with an aluminum containing alloy molten metal, as for this molten metal, a wrap will not go a heat insulator top into the clearance in a heat insulator for the surface tension of a molten metal. Therefore, a clearance is generated between a griddle and an aluminum containing alloy molten metal. This clearance consists of the above-mentioned heat insulator and a gas phase, and it prevents that the heat of an aluminum containing alloy molten metal gets across to a griddle rapidly. Next, coagulation adhesion is carried out as it is, making this molten metal permeate the clearance inside the clearance which applied high pressure to this molten metal shortly after the aluminum containing alloy molten metal was filled in mold, and had been produced with the heat insulator, and a heat insulator at a stretch, also soaking the front face of a griddle in coincidence by this molten metal, and forcing a griddle on a mold side.
[0009] By carrying out like this, at a stretch, the whole surface touches, and is heated at an aluminum containing alloy molten metal, and the layer and the Al alloys on the front face of a griddle, such as low melting alloys, weld a griddle. In this way, one field of a griddle is welded with an aluminum containing alloy molten metal, and is united, and another field is compound-ized by the form exposed on the surface of the aluminium alloy casting.
[0010] Moreover, the thickness of the clearance between the griddles and aluminum containing alloy molten metals which a heat insulator makes should just be thickness at which only the adiabatic efficiency to which a short time until this molten metal is filled by mold and high pressure is applied to this molten metal, and a griddle are not severely distorted by the conductive heat received from this molten metal is maintained. In fact, after an aluminum containing alloy molten metal crushes the layer of a heat insulator, a very thin clearance 1mm or less should just be made.
[0011] Moreover, high pressure is applied and the layer of the heat insulator with which an aluminum containing alloy molten metal is compound-ized by permeating serves as composite material with an aluminum containing alloy. The coefficient of thermal expansion of this composite material becomes smaller than the coefficient of thermal expansion of an aluminum containing alloy, when it of a heat insulator uses the ingredient of a coefficient of thermal expansion smaller than an aluminum containing alloy. Therefore, if the class of heat insulator is chosen and used so that it may become the coefficient of thermal expansion near the steel member compound-ized, it can also prevent a steel member exfoliating according to the difference of coefficient of thermal expansion.
[0012] Moreover, SS, SCM, SUS, Fe, etc. are used as a steel member. Moreover, layers, such as low melting alloys attached to the front face of a steel member, make zinc, aluminum, a zincky alloy and aluminum, aluminum, such as an alloy of magnesium, and tin, and an alloy, and are constituted. Moreover, as a heat insulator, the thing of the shape of a mat of an alumina fiber or ceramic fiber or the moldings of various whiskers, the moldings of various powder, the moldings of a metal fiber, the porous body of the ceramics, etc. can be used.
[0013]
[The example of fruit **] Hereafter, the example shown in a drawing is further explained to a detail.

[0014] The example shown in drawing 1 shows the longitudinal section of the tableware made from an aluminum containing alloy which compound-ized the griddle using the approach of this invention. If the manufacture approach of this invention is explained using this manufacture process, first, **** will turn the field which galvanized the galvanized griddle whose 0.5mm diameter is 20cm up, and will put on the base of metal mold directly at the female mold of the mold for high pressure casting for tableware.
[0015] Next, thickness covers with a mat-like alumina fiber on a griddle by 2-3mm as a heat insulator. JIS If metal mold is filled with an AC7A molten metal, this molten metal will become a wrap form about a heat insulator. Then, this molten metal is made to apply and solidify the high pressure of 100kg/cm2 immediately. Then, metal mold is opened and a cast is taken out. The

aluminium alloy casting to which one side of a thin griddle was exposed at the above process can be cast.

[0016] Moreover, after filling metal mold with an aluminum containing alloy molten metal, a heat insulator can be floated on the surface of hot water, a thin griddle can be carried on this heat insulator; and high pressure can also be applied and cast. If it does in this way, in another field, a steel member can be compound-ized for Plastic solids which become one field of an aluminium cast from the quality of the ceramics, or the quality of a metal, such as fiber and a whisker.

[0017] Moreover, on the surface of tableware, surface treatment which is shown in JP,63-45983,Y and which gets damaged also neither with a knife nor a fork is performed, and if a griddle is fixed by the approach by this invention at the rear face of tableware, the steak pan made from aluminum lighter than the iron which can be heated with an induction heating cooker can be made cheaply. Moreover, since the base of the frying pan made from an aluminium alloy casting or a pan can also be made to compound-ize a thin griddle by the approach by this invention, it can heat with an induction heating cooker. Moreover, when making the griddle of an as-you-like-it pancake, GURIDORU, etc. from an aluminium alloy casting, a thin griddle can be made to fix so that it can heat with an induction heating cooker.

[0018]

[Effect of the Invention] If the approach by this invention is used as stated above, easily, cost can be pressed down and the tableware made from the aluminum for induction heating cookers and the instrument for kitchens can be manufactured. And between the griddles and aluminium casts which a blow hole does not occur in a casting and serve as a heating element, since it is high pressure casting, since a clearance is not made at all, as a heating object mounting arrangement for induction heating cookers, it is ideal. Moreover, if stainless steel is used for a steel member, there are also no worries about rust and it can consider as a beautiful appearance.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view showing the example of this invention.
[Description of Notations]
1 Griddle
2 Alloy Layer of Low Melting Alloys Etc. and Aluminum
3 Layer Which Compound-Ized Heat Insulator with Aluminum Containing Alloy
4 Aluminium Alloy Casting

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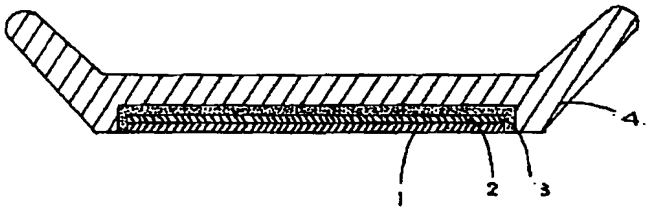
DRAWINGS

[Drawing 1]



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CORRECTION OR AMENDMENT

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[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] the molten metal when compound-izing a steel member with a high pressure casting process to an aluminium cast, after attaching layers, such as aluminum or an aluminium alloy (it abbreviates to an aluminum containing alloy below), and low melting alloys to weld, to the front face of a steel member, covering the part with which a steel member touches a molten metal on it with a heat insulator and injecting a molten metal into it -- high pressure -- in addition, the approach of compound-izing the steel member characterized by compound-izing said heat insulator and a steel member to coincidence.
[Claim 2] The aluminium cast characterized by the thermal break to which a steel member becomes the front face of a steel member from minerals or a metal in the compound-ized aluminium cast, and the aluminum containing alloy layer forming the layer of composite.
[Claim 3] The aluminium cast characterized by the thermal break which layers, such as low melting alloys prepared in the front face of a steel member, make an aluminum containing alloy and an alloy layer in the aluminium cast with which the steel member was compound-ized, and consists of minerals or a metal near said alloy layer, and an aluminum containing alloy layer forming the layer of composite.
[Claim 4] The aluminium cast characterized by applying claim 2 or claim 3 to the circumference part containing the pars basilaris ossis occipitalis or pars basilaris ossis occipitalis of cookware.
[Procedure amendment 2]

[Document to be Amended] Specification
[Item(s) to be Amended] 0004
[Method of Amendment] Modification
[Proposed Amendment]
[0004]
[Means for Solving the Problem] When a steel member was filled with a molten metal, as the clearance was temporarily made between the molten metal and the steel member and heat did not get across to a steel member rapidly in this clearance, distortion by heat was prevented, then high pressure was applied to the molten metal, and we filled the molten metal at a stretch in said clearance, and decided to compound-ize a steel member. That is, after attaching layers, such as an aluminum containing alloy and low melting alloys to weld, to the front face of a steel member, covering the part with which a steel member touches a molten metal with a heat insulator and pouring out a molten metal, high pressure was applied to the molten metal and the technical problem was solved by compound-izing said heat insulator and a steel member to coincidence.
[Procedure amendment 3]
[Document to be Amended] Specification
[Item(s) to be Amended] 0005
[Method of Amendment] Modification
[Proposed Amendment]
[0005] When compound-izing a steel member with a high pressure casting process to an aluminium cast, after invention according to claim 1 prepares the layer of alloys, such as an aluminum containing alloy and the low melting alloys to weld, for example, zinc, tin, and magnesium, in the front face of a steel member, covers the part with which a steel member touches an aluminum molten metal on it with heat insulators, such as an alumina fiber and ceramic fiber, and injects an aluminum molten metal into it, it is the approach of applying high pressure to a molten metal and compound-izing said heat insulator and a steel member to coincidence. Invention according to claim 2 is the aluminium cast with which the thermal break to which a steel member becomes **** of a steel member from the moldings of various whiskers, the moldings of various powder, the moldings of the porous body metallurgy group fiber of the ceramics, etc. in the compound-ized aluminum casting, and the aluminum containing alloy formed the layer of composite. the porous body [the layer of low-melt point point metals, such as the zinc and tin which prepared invention according to claim 3 in the front face of a steel member in the aluminium cast with which the steel member was compound-ized, and magnesium, makes an aluminum containing alloy and an alloy layer, and / the moldings of an alumina fiber, ceramic fiber, or various whiskers, the moldings of various powder, the moldings of a metal fiber, and the ceramics] near said alloy layer -- ** -- since -- the becoming thermal break and an aluminum containing alloy are the aluminium casts which form the layer of composite. Invention according to claim 4 is the aluminium cast which applied invention according to claim 2 or 3 to the bottom part of cooking devices, such as a steak pan, a frying pan, a pan, and GURIDORU, or the circumference part containing a pars basilaris ossis occipitalis.

[Translation done.]

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審査請求　未請求　請求項の数２(全　３　頁)　最終頁に続く

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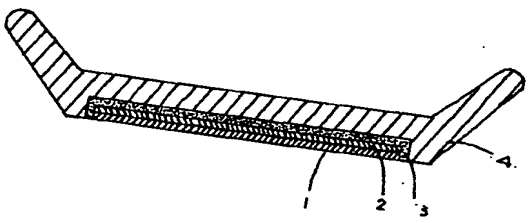
(54)【発明の名称】　鉄鋼部材を複合化する方法とアルミニウム鋳物。

(57)【要約】

【目的】　アルミ合金鋳物に、薄板状の鉄鋼部材を鋳くるむ場合において、アルミ合金溶湯の熱により、鉄鋼部材が加熱されて歪みを生じ、平らな状態で鋳くるむことができなかった。この欠点を防止し、アルミ合金鋳物に鋳くるまれる鉄鋼部材が、歪まずに複合化することの出来る方法を提供するものである。

【構造】　アルミ合金鋳物内に複合化される鉄鋼部材の表面に、アルミニウムと合金を作る低融点合金等の層を設け、鋳型内に配置したあと、鉄鋼部材がアルミ合金溶湯に触れる大部分に、鉄鋼部材の表面に気体層を作るための断熱材層を設け、アルミ合金溶湯を注入したあと、該溶湯に高圧を加えて、断熱材と鉄鋼部材とを同時に複合化する方法。



【特許請求の範囲】

【請求項１】　アルミニウム鋳物に鉄鋼部材を高圧鋳造法で複合化する場合において、鉄鋼部材の表面に、アルミニウム又はアルミニウム合金（以下アルミ合金と略す）と溶着する低融点合金等の層をつけ、鉄鋼部材が溶湯に触れる部分を断熱材で覆い、溶湯を注入したあと、溶湯に高圧を加えて、前記断熱材及び鉄鋼部材を同時に複合化する事を特徴とした、鉄鋼部材を複合化する方法。

【請求項２】　鉄鋼部材が複合化されたアルミニウム鋳物において、鉄鋼部材の表面に設けた低融点合金等の層がアルミ合金と合金層を作り、かつ前記合金層の付近に、無機質あるいは金属からなる断熱層とアルミ合金とが複合材の層を形成したことを特徴とするアルミニウム鋳物。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】この発明は、アルミニウムの鋳物に、薄板鉄板のような熱歪みを生じ易い金属部材を複合化する場合に利用されるもので、特に電磁調理器で加熱するアルミニウム製の食器の製造などに用いられるものである。

【０００２】

【従来の技術】従来、アルミニウム鋳物に鉄などの鉄鋼部材を鋳くるむ場合、注ぎ込まれる溶湯が、鋳くるまれる金属部材の表面に直接触れて流れ、鋳くるまれるような鋳造方案になっている。この場合、鋳型に注ぎ込まれた溶湯は、鋳型の一部から全体へと順次鋳型を満たしてゆく。従って、鋳型内に置かれた鉄鋼部材は、その一部から順次溶湯によって、熱をうけることになる。このため、鉄鋼部材が歪みにくい円筒状や、肉厚の厚い部材であるときは、鉄鋼部材が熱で歪むことも少なく、うまく鋳くるむことが出来た。しかし肉厚が１ミリ以下で、かつ直径が５０ミリ以上の鉄板を、片面が鋳物の表面に露出している形に鋳くるむ場合、アルミ合金溶湯が鉄板の一端に触れると同時に熱のために歪み、平らに鋳くるむことが出来なかった。

【０００３】

【発明が解決しようとする課題】本発明は、薄い金属板を、一方の面が鋳型に接し、もう一方の面がアルミ鋳物に固着された状態で、歪むことなく平らに鋳くるみ、かつ鉄板と密着させるための方案を示すことを課題とした。

【０００４】

【課題を解決するための手段】溶湯が鉄鋼部材に注がれたとき、一時的に溶湯と鉄鋼部材との間に隙間を作り、この隙間で鉄鋼材料に熱が急激に伝わらないようにして、熱による歪みを防ぎ、次に溶湯に高圧を加えて、前記隙間に一気に溶湯を満たし、鉄鋼部材を複合化することとした。

【０００５】即ち、鉄鋼部材の表面にアルミ合金と溶着する低融点合金等の層をつけ、該溶湯に鉄鋼部材が触れる部分を断熱材で覆い、該溶湯を注ぎ入れたあと、該溶湯に高圧を加えて、前記断熱材及び鉄鋼部材を同時に複合化することにより課題を解決した。

【０００６】

【作　用】前記のように、従来の方法では、平板状の薄板、例えば肉厚が１ミリ以下で直径が５０ミリ以上の鉄板をアルミ合金溶湯で鋳くるむとき、鉄板ガ歪み、平らな状態では鋳くるむことが出来なかった。この原因の一つは、うすい平板という形状が変形しやすいこと、もう一つはアルミ合金溶湯が短時間ではあるが鉄板の一端から、しかも片面だけに順次触れてゆくため、鉄板が瞬間的に熱で歪んでしまうためであると思われる。

【０００７】そこで本発明は、鉄板にアルミ合金溶湯が、片面の全面に、同時に触れ、かつ該溶湯が鉄板を金型面に押しつけつつ凝固するようにした。従って、鉄板を歪むことなく、アルミ合金溶湯に密着した状態で、かつ鉄板の片面を露出させた状態に複合化することが出来たのである。

【０００８】まず、金型にセットされた鉄板を断熱材で覆う。この鋳型にアルミ合金溶湯が注がれると、該溶湯は断熱材の上を覆うが、溶湯の表面張力のため、断熱材の中の隙間には入らない。したがって、鉄板とアルミ合金溶湯との間に隙間が生じる。この隙間は、上記断熱材と気体相とからなり、鉄板にアルミ合金溶湯の熱が急激に伝わるのを防止する。次に、鋳型内にアルミ合金溶湯が満たされると、直ちに該溶湯に高圧を加え、断熱材によって生じていた隙間や、断熱材内部の隙間に該溶湯を一気に浸透させ、同時に鉄板の表面をも該溶湯でぬらし、鉄板を鋳型面に押しつけつつそのまま凝固凝着させる。

【０００９】こうすることによって、鉄板は、全面が一気にアルミ合金溶湯に触れ、加熱され、鉄板表面の低融点合金等の層とアル合金とが溶着する。こうして、鉄板の一方の面は、アルミ合金溶湯と溶着して一体となり、もう一方の面はアルミ合金鋳物の表面に露出した形に複合化される。

【００１０】また、断熱材が作りだす鉄板とアルミ合金溶湯との隙間の厚さは、鋳型に該溶湯が満たされ、高圧が該溶湯に加えられるまでの短時間、鉄板が該溶湯から受ける伝導熱でひどく歪まないだけの断熱効果が保たれる厚さであればよい。実際には、アルミ合金溶湯が断熱材の層を押しつぶしたあとに、１ミリ以下のごく薄い隙間が出来ればよい。

【００１１】また、高圧が加えられ、アルミ合金溶湯が浸透して複合化される断熱材の層は、アルミ合金との複合材料となる。この複合材料の熱膨張率は、断熱材のそれがアルミ合金より小さい熱膨張率の材料を使用するとき、アルミ合金の熱膨張率より小さくなる。したがっ

て、複合化される鉄鋼部材に近い熱膨張率になるよう、断熱材の種類を選んで用いれば、鉄鋼部材が熱膨張率の差によって剥離するのを防ぐこともできる。

【００１２】また、鉄鋼部材としてはＳＳ，ＳＣＭ，ＳＵＳ，Ｆｅなどが用いられる。また、鉄鋼部材の表面につける低融点合金等の層は、亜鉛、アルミニウムと亜鉛の合金、アルミニウムとマグネシウムの合金、錫など、アルミニウムと合金を作るもので構成される。また、断熱材としては、アルミナ繊維やセラミック繊維のマット状のもの、或いは各種ウイスカーの成形物、各種粉末の成形物、金属繊維の成形物、セラミックスの多孔質体などを用いることができる。

【００１３】

【実　施　例】以下、図面に示す実施例についてさらに詳細に説明する。

【００１４】図１に示す実施例は、本発明の方法を用いて、鉄板を複合化したアルミ合金製食器の縦断面を示したものである。この製造過程を用いて本発明の製造方法を説明すると、まず食器用高圧鋳造用鋳型の下型に、厚さが０．５ミリ直径が２０センチの亜鉛メッキされた鉄板を、亜鉛メッキをした面を上にして金型の底面に直接置く。

【００１５】次に、断熱材として、厚さが２～３ミリで、マット状のアルミナ繊維を鉄板の上に敷きつめる。ＪＩＳ　ＡＣ７Ａ溶湯を金型に注ぎ入れると該溶湯は断熱材を覆う形になる。その後、直ちに、１００ｋｇ／ｃｍ² の高圧を該溶湯に加え凝固させる。その後、金型を開いて鋳造品を取り出す。以上の工程で、うすい鉄板の片面を露出させたアルミ合金鋳物を鋳造することが出来る。

【００１６】また、金型にアルミ合金溶湯を注ぎ入れたあと、湯面上に断熱材を浮かし、この断熱材の上に薄い鉄板を載せ、高圧を加え鋳造することもできる。このよ＊

＊うにすれば、アルミニウム鋳物の一方の面にはセラミックス質あるいは金属質からなる繊維やウイスカー等の成形体を、もう一方の面には鉄鋼部材を複合化することができる。

【００１７】また、食器の表面に、実公昭６３－４５９８３に示される、ナイフやフォークでも傷つかない表面処理を施し、食器の裏面に本発明による方法で鉄板を固着すれば、電磁調理器で加熱することができる鉄製より軽いアルミニウム製ステーキ皿を、安価に作ることができる。また、アルミ合金鋳物製フライパンや鍋の底面にも、本発明による方法で、薄い鉄板を複合化させることが出来るから、電磁調理器で加熱することができるようになる。また、お好み焼きの鉄板、グリドルなどをアルミ合金鋳物で作る場合、電磁調理器で加熱できるように、薄い鉄板を固着させることができる。

【００１８】

【発明の効果】以上述べたように、本発明による方法を用いると、電磁調理器用アルミニウム製の食器や厨房用の器具を、容易に、コストを押さえて製造することができる。しかも、高圧鋳造であるため、鋳物に巣が発生することがなく、発熱体となる鉄板とアルミニウム鋳物との間に、隙間が全くできないから、電磁調理器用の加熱体取り付け方法としては理想的である。また、鉄鋼部材にステンレスを用いると、錆の心配もなく、きれいな外観とすることができる。

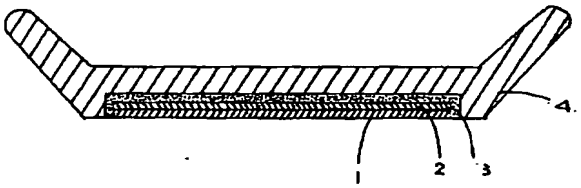
【図面の簡単な説明】

【図１】この発明の実施例を示す断面図である。

【符号の説明】

１　鉄板
２　低融点合金等とアルミニウムとの合金層
３　断熱材をアルミ合金と複合化した層
４　アルミ合金鋳物

【図１】



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【手続補正書】
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【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】特許請求の範囲
【補正方法】変更
【補正内容】
【特許請求の範囲】
【請求項１】　アルミニウム鋳物に鉄鋼部材を高圧鋳造法で複合化する場合において、鉄鋼部材の表面に、アルミニウム又はアルミニウム合金（以下アルミ合金と略す）と溶着する低融点合金等の層をつけ、鉄鋼部材が溶湯に触れる部分を断熱材で覆い、溶湯を注入したあと、溶湯に高圧を加えて、前記断熱材及び鉄鋼部材を同時に複合化することを特徴とした、鉄鋼部材を複合化する方法。
【請求項２】　鉄鋼部材が複合化されたアルミニウム鋳物において、鉄鋼部材の表面に、無機質あるいは金属からなる断熱層と、アルミ合金層とが複合材の層を形成していることを特徴とするアルミニウム鋳物。
【請求項３】　鉄鋼部材が複合化されたアルミニウム鋳物において、鉄鋼部材の表面に設けた低融点合金等の層がアルミ合金と合金層を作り、かつ前記合金層の付近に、無機質あるいは金属からなる断熱層と、アルミ合金層とが複合材の層を形成したことを特徴とするアルミニウム鋳物。
【請求項４】　請求項２または請求項３を調理器具の底部または、底部を含む周辺部分に適用したことを特徴とするアルミニウム鋳物。
【手続補正２】
【補正対象書類名】明細書
【補正対象項目名】０００４
【補正方法】変更
【補正内容】
【０００４】
【課題を解決するための手段】溶湯が鉄鋼部材に注がれたとき、一時的に溶湯と鉄鋼部材との間に隙間を作り、この隙間で鉄鋼部材に熱が急激に伝わらないようにして、熱による歪みを防ぎ、次に溶湯に高圧を加えて、前記隙間に一気に溶湯を満たし、鉄鋼部材を複合化することとした。即ち、鉄鋼部材の表面にアルミ合金と溶着する低融点合金等の層をつけ、溶湯に鉄鋼部材が触れる部分を断熱材で覆い、溶湯を注ぎ入れたあと、溶湯に高圧を加えて、前記断熱材および鉄鋼部材を同時に複合化することにより課題を解決した。
【手続補正３】
【補正対象書類名】明細書
【補正対象項目名】０００５
【補正方法】変更
【補正内容】
【０００５】請求項１記載の発明は、アルミニウム鋳物に鉄鋼部材を高圧鋳造法で複合化する場合において、鉄鋼部材の表面に、アルミ合金と溶着する低融点合金、例えば亜鉛、錫、マグネシウム等の合金の層を設け、鉄鋼部材がアルミ溶湯に触れる部分を、アルミナ繊維やセラミック繊維などの断熱材で覆い、アルミ溶湯を注入したあと、溶湯に高圧を加えて、前記断熱材及び鉄鋼部材を同時に複合化する方法である。請求項２記載の発明は、鉄鋼部材が複合化されたアルミ鋳物において、鉄鋼部材の表面に、各種ウイスカーの成形物、各種粉末の成形物、セラミックスの多孔質体や金属繊維の成形物などからなる断熱層と、アルミ合金とが複合材の層を形成したアルミニウム鋳物である。請求項３記載の発明は、鉄鋼部材が複合化されたアルミニウム鋳物において、鉄鋼部材の表面に設けた、亜鉛、錫、マグネシウム等の低融点金属の層がアルミ合金と合金層を作り、かつ前記合金層の付近にアルミナ繊維やセラミック繊維、或いは各種ウ

イスカーの成形物、各種粉末の成形物、金属繊維の成形物、セラミックスの多孔質体なとからなる断熱層と、アルミ合金とが複合材の層を形成しているアルミニウム鋳物である。請求項４記載の発明は、請求項２または請求項３記載の発明を、ステーキ皿やフライパン、鍋、グリドルなどの調理器の底部分、または底部を含む周辺部分に適用したアルミニウム鋳物である。